WHAT IS CLAIMED IS:

1. A nonvolatile semiconductor memory device comprising:

a semiconductor substrate;

memory transistors formed on said semiconductor substrate to perform nonvolatile storage of an electric charge in accordance with data;

protective side walls in form of first silicon nitride films formed by low-pressure CVD and maintained on side walls of gates of each said memory transistor;

a second silicon nitride film covering surfaces of said gate, surface of a source diffusion layer, surface of a drain diffusion layer and surfaces of said protective side walls of each said memory transistor; and

a wiring layer formed on said second silicon nitride film via an inter-layer insulating film containing silicon oxide as its major component.

2. The nonvolatile semiconductor memory device according to claim 1 wherein said each memory transistor is an electrically rewritable memory transistor including a floating gate formed on said semiconductor substrate via a first gate insulating film, and a control gate formed above said floating gate via a second gate insulating film.

3. The nonvolatile semiconductor memory device according to claim 1 wherein said second silicon nitride film is deposited by plasma CVD.

4. The nonvolatile semiconductor memory device according to claim 1 wherein said second silicon nitride film is deposited by low-pressure CVD.

5. The nonvolatile semiconductor memory device according to claim 4 wherein metal silicide films are formed on surfaces of a gate, a surface of a source diffusion layer and a surface of a drain diffusion layer of each said transistor, respectively.

6. The nonvolatile semiconductor memory device according to claim 5 wherein said drain diffusion layer connects to a bit line via said metal silicide film and said source diffusion layer connects to a common source line via said metal silicide film, respectively.

7. The nonvolatile semiconductor memory device according to claim 1 further comprising at least one of a low-voltage MOS transistor and a high-voltage MOS transistor as a peripheral circuit.

8. A method for manufacturing a nonvolatile semiconductor memory device comprising:

a first step of forming in a semiconductor substrate memory transistors for performing nonvolatile storage of an electric charge in accordance with data;

a second step of depositing a first silicon nitride film by low-pressure CVD to cover said memory transistors and selectively maintaining said first silicon nitride film as protective side walls on side walls of gates of each said memory transistor;

a third step of stacking a second silicon nitride film to cover a surface of gate, a surface of a source diffusion layer, a surface of a drain diffusion layer and said protective side walls of said memory transistor; and

a fourth step of forming a wiring layer above said second silicon nitride film via an inter-layer insulating film including a silicon oxide film as its major component.

9. The method for manufacturing a nonvolatile semiconductor memory device according to claim 8 wherein, in said third step, said second silicon nitride film is deposited by plasma CVD.

10. The method for manufacturing a nonvolatile semiconductor memory device according to claim 8 wherein, in said third step, said second silicon nitride film is deposited by low-pressure

CVD.

11. The method for manufacturing a nonvolatile semiconductor memory device according to claim 8 wherein, after selectively maintaining said first silicon nitride film as said protective side walls on said side walls of gates in said second step and before depositing said second silicon nitride film in said third step, a metal silicide film deposition step is interposed for selectively making a metal silicide film on said surfaces of a gate, said surface of the source diffusion layer, and said surface of the drain diffusion layer.

12. The method for manufacturing a nonvolatile semiconductor memory device according to claim 11 wherein an oxide film covering step for covering exposed surfaces of said semiconductor substrate and said memory transistors is interposed between said first step and said second step, and in said metal silicide film deposition step, by etching said oxide film, said surfaces of the gate, said surface of the source diffusion layer and said surface of the drain diffusion layer are exposed, and thereafter said metal silicide film is formed.

13. The method for manufacturing a nonvolatile semiconductor memory device according to claim 12 wherein said oxide film covering step includes two steps, one of which is an oxidation step by secondary oxidation and the other of which is an oxidation step by CVD.

14. The method for manufacturing a nonvolatile semiconductor memory device according to claim 11 wherein said metal silicide film is a titanium silicide film.

15. The method for manufacturing a nonvolatile semiconductor memory device according to claim 11 wherein said second to fourth steps are common to a manufacturing step of at least one of a low-voltage MOS transistor and a high-voltage MOS transistor as a peripheral circuit.